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Biosorption of bleaching compounds by lignocellulosic materials

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Paper, dyes, fabric and fiber industries constantly use bleaching substances as routine steps in their industrial processes. These residual waters are normally discharged into water streams with a convenient and specialized treatment. Use of light, electricity, chemical degradation and other techniques produce side-products and/or require big capitals for their proper operation. In this project, phenol is biosorbed from aqueous solutions as a model phenolic compound. These types of compounds are widely known as powerful bleaching agents and used in industries. Spent tea leaf wastes from green tea (GT), peppermint (PM), and chamomile (CM) were used as eco-friendly adsorbents for the elimination of phenol from these solutions. These materials were chosen based on their biodegradability and massive collection as industrial waste from drink industries. A comparative adsorption study of these tealeaf wastes under different experimental conditions like acidity, adsorbent dose, and amount of phenol in solution presence of salts, crowding agents and other inorganic pollutants like lead was explored. Experimental data shows that all the adsorbents are potential candidates as biosorbents of phenols from solution. Adsorption was optimized at pH 2 and using between 120-140 mg of the adsorbents. Presence of salts and crowding agent (polyethylene glycol) had negative effects on the adsorption. Chemical characterization of the adsorbents by infrared spectroscopy elucidated the presence of important functional groups such as carboxyl, hydroxyl and carbonyl as responsible for the adsorption of phenol.

Biography

Abel E Navarro and all the coauthors are sophomore students at BMCC, majoring in Engineering and Science. They have been working under the mentorship of Professor Navarro since January this year and have already participated in major undergraduate events as oral speakers and poster presenters. Their long-term goals include specializations in Medicine, Dentistry and Pharmaceutical fields at their respective senior colleges. The authors would like to thank CSTEP and the Science Department at BMCC for the financial support. A.N. is recipient of the BMCC Faculty Development Grant and BMCC Presidential Scholar.

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